



PATENT
Docket No.: ACT-377

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Group Art Unit: 2811

Examiner: Donghee Kang

Serial No.: 10/625,490

Filed: July 22, 2003

In re Application of: Issaq et al.

For: SWITCHING RATIO AND ON-STATE RESISTANCE OF AN
ANTIFUSE PROGRAMMED BELOW 5 mA AND HAVING A Ta OR
TaN BARRIER METAL LAYER

DECLARATION OF FRANK HAWLEY

Frank Hawley declares and states as follows:

1. I am employed as chief engineer by Actel Corporation, assignee of the present invention. I have been so employed for over fourteen years. I have been employed in the semiconductor industry in the field of process engineering for over twenty-five years. Because of my experience, I consider myself to be a person of ordinary skill in the semiconductor processing art.

2. I am one of the named inventors of the subject matter claimed in the instant application. I am also a named inventor of the subject matter disclosed in United States Patent No. 6,437,365, cited as a prior-art reference against the claims in the instant application. I am familiar with the contents of both the instant application and my prior-art patent. I have also read and understand the Office Action in the instant application that was mailed on August 9, 2005.

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3. The Examiner is incorrect in assuming that the fact that SiN functions as an adhesion layer for amorphous silicon would render obvious the use of SiN as an adhesion layer for amorphous carbon. The fact that a specific material functions as an adhesion layer for one material does not imply that it also functions as an adhesion layer for a different material. Therefore, the fact that SiN functions as an adhesion layer for amorphous silicon does not imply that it would function as an adhesion layer for amorphous carbon.

4. The use of the particular combination of materials recited in the pending claims results in an antifuse having unexpectedly superior properties. An antifuse formed as recited in the pending claims has significant unobvious and superior properties when compared with prior-art antifuses. First, such an antifuse is more reliable because it does not switch (i.e., revert back to its unprogrammed state) as do prior-art antifuses such as are disclosed in my prior patent. This is a critically important property for use in a product. Second, the antifuse as claimed in the pending claims of the instant application programs using a current of only about 1 mA, as opposed to the prior-art antifuses which require currents on the order of between about 5-25 mA to program. The significantly lower programming current of the antifuse of the present invention enables the design of a smaller product because the programming transistors can be made using smaller geometries.

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5. These properties of the antifuse as recited the pending claims are unexpected and would not be suggested by any of the prior art. They allow for a smaller and more reliable product, which thus has a much greater value and utility than products employing prior-art antifuses.

I, the undersigned, declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing therefrom.

Date: Feb 9, 2006

Frank Hawley
Frank Hawley